

DELAY LINES

TO
MILITARY
AND
COMMERCIAL
SPECIFICATIONS

New products for 1965

SUB-MINIATURE VARIABLE DELAY LINE SIZE: .3 x .3 x .8 in.

V982	-1	-2	-3	-4
Delay Nanosec.	3-25	3-30	4-50	5-100
Impedance Ohms	1000	500	270	50
Rise Time Nanosec.	20	25	40	90



V982

ELECTRICALLY VARIABLE DELAY LINES • LOW DISTORTION • DELAY LINEAR FUNCTION OF VOLTAGE

Model	Delay Range microsec.	Rise Time microsec.
DEV997	.01-10	0.2
DEV998	1-1000	20
DEV999	10-10000	200 Kc



(See CORRELATION D.L. below)

DEV999

LUMPED CONSTANT DELAY LINES

FIXED AND TAPPED DELAYS

Model	Delay Microsec.	Rise Time Microsec.	Step or Tap Delays μ sec.	Imped. Ohms	Attenuation db	Size
D1000	20.3	.5	1.45	330	6	2 x 4 x .31
D389	20.3	.4	1.45	330	4	4 x 4 x .37
D637	20.3	.3	1.45	180	10*	2.37 x 2.75 x 3.18
D203	20.3	.35	1.45	470	3	10 x 2.5 x 2.25
D170	20.3	.60	1.45	510	3	4 x 2 x 1
D231	20.3	.50	1.45	2200	2	4 x 3 x 2
D978	24.65	.45	2.90	180	6*	7.5 x 4 x 2
D297A	24.65	.50	1.45	500	3	2.87 x 2 x 4.25
D298A	25.3	.50	Special	500	3	2.87 x 1.62 x 4.25

CODING LINES for Radar Recognition Sets — Tap spacing 1.45 μ sec. Accuracy up to ± 0.02 μ sec over Mil. specs. Lumped Constant hermetically sealed units — Other special tap spacings are also provided — Lines may be used for encoding or decoding —

*Equalizing Resistors included in package.

TYPICAL LUMPED CONSTANT TYPES — Large variety of performance characteristics available. Delay to rise time ratios of up to 175 to 1 — accuracies up to .1% over Mil. Spec. range. Hermetically sealed in metal containers.

AUDIO DELAY AND SONAR LAG LINES

Model	Delay Microsec.	3 db B.W. Kc	Step or Tap Delays μ sec.	Imped. Ohms	Attenuation db	Size
*DA921	420	100		2000	4	14 x 2 x 1
DA563	500	30	25	1000	6	7 x 2.5 x 2
DA301	1000	20	20	600	3	19 x 3.5 x 9
DA261	5000	5	40	500	3	19 x 5.25 x 10
DA607	20000	3.5	80	500	1	19 x 7 x 15
DA177	100000	.2	1000	1000	10	19 x 21 x 12
AV175	0 - 150	30	.1	500	6	9 x 3 x 6
AV287	0 - 500	20	.002	1000	3	19 x 3.5 x 12
AV206	0 - 1000	20	1.0	600	3	19 x 3.5 x 12
AV731	0 - 5000	5	.1	1000	2	19 x 5.25 x 15
AV211	0 - 10000	2.5	.1	600	3	19 x 5.25 x 15

FIXED AND TAPPED DELAYS of low frequency C.W. signals. High accuracy of delay — Temperature stability 40 PPM/ $^{\circ}$ C, VSWR $\pm 1/2$ db. Phase linearity $\pm 1/4\%$.

*DA921 has VSWR of ± 1 db.

VARIABLE DELAYS — Decade insertion type switching — provides low signal distortion and input and output impedance of equal value — Other characteristics same as fixed line.

VARIABLE DELAYS

Model	Delay Range Microsec.	Rise Time Microsec.	Resolution	Imped. Ohms	Attenuation db	Size
One Turn	Movable tap on coil type.					
Multi-Turn	Movable tap on coil type.					
Multi-Turn	Movable tap on coil type.					
Multi-Turn	Movable tap on coil type.					
Multi-Turn	Movable tap on coil type.					
Multi-Turn	Movable tap on coil type.					
Phase Shifter	for up to 200 Kc.					
VP162	0 - 7	.3	Infinite	150	30	2 x .75 x 5
VP333	0 - 12	1.2	Infinite	10000	30	1.37 dia. x 10

ULTRA MINIATURE VARIABLES

Model	Delay Range Nanosec.	Rise Time Nanosec.	Resolution	Imped. Ohms	Attenuation db	Size
V447-1	0 - 55	15	.5	150	1	1 x .31 x 1.25
V447-2	0 - 100	30	.7	50	1	1 x .31 x 1.25
V447-3	0 - 150	25	.6	150	1	1 x .31 x 2.45
V447-4	0 - 250	30	1.0	50	1.5	1 x .31 x 2.45
V447-5	0 - 300	30	.6	150	1.5	1 x .31 x 3.45
V447-6	0 - 500	60	1.0	50	2	1 x .31 x 3.45
DV875	0 - 100	20	.3	1000	1	1 x .31 x 3.45
DV810	0 - 200	40	.6	1000	1	1 x .31 x 2.45
V975	0 - 40	10	.02	200	1	1 x .31 x 2.45
V887	0 - 300	60	1.0	75	2	1 x .31 x 2.45

D647 SERIES — MINIATURE MODULES

Delay Choice	Choice Imped.	Delay to Rise Time Ratio	Size
50; 100; 250; 500 and 750 nanosec.	50 ohms	4:1	1 x .31 x 1.25
1.0; 1.45; 2.90* and 4.35* microsec.	150 ohms and 500 ohms	8:1 and 12:1	1 x .31 x 2.20 and 1 x .31 x 3.45

Lumped Constant Printed circuit mounting modules can be cascaded to obtain any desired delay. Case size depends on delay to rise time required. Units are compatible with variable V447 series.

* Tapped each 1.45 μ sec. for use in coders.

DO IT YOURSELF DELAY ADJUSTMENT

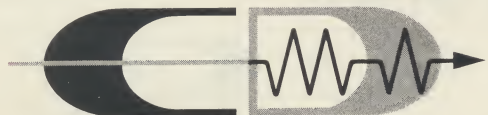
Part No.	Section Delay — Nanosec.	Tot. Delay Nanosec.	Rise Time Nanosec.
D740	5; 10; 20; 30; 40	105	15
D742	50; 100; 200; 300; 400	1050	150
D744	One Delay	100	15
D746	One Delay	1000	150

5 completely separate sections in each module. Cascaded modules allow selection of any desired delay in 5 nanosec. increments. Ideal for experimental work. Size of all modules 1 x .31 x 2.25 for printed circuit mounting.

ELECTRICALLY VARIABLE

Model	Delay μ sec.	Rise Time μ sec.	Distortion %	Imped. Ohms	Attenuation db	Size
DEV623A	.03 to .04	.008	10	150	2	2 x 1 x .31
DEV350	3 to 7	.25	10	1000	3	3.5 x 4 x 4

Delay is varied by varying a D.C. control voltage. Both L & C are controlled to minimize mismatch.

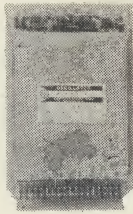


COMPUTER DEVICES CORP.

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New products for 1965



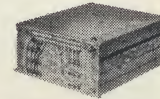
STABLE OSCILLATOR

Frequency — .1 cps to 25 Kc
Accuracy — .001% standard
up to — .0002% special
Stability — 0°C to 50°C
.005% Std. to .0005% special
Featuring — adjustable frequency
and/or Electrically Variable
Size — 5 x 7 x 1.12

MO965

COMPUTER MEMORY FOR AIRBORNE USE

For airborne use
24,000 bits Max. stor.
3 separate channels
2 Mc clock rate
Size — 7 x 5.87 x 3
To MIL specs



MA917

**DELAY
LINES**
TO
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WIRE SONIC — MAGNETOSTRICTIVE DELAY LINES

FIXED DELAYS

	Model	Maximum Delay Microsec.	Max. Bit Rate RZ or C.W. Cent. Freq. Mc.	Size
LONGITUDINAL MODE — Short delays with ± 4 μ sec trim adjustment; standard temperature coefficient 150 PPM/°C, provided as low as 2 PPM/°C.	ML545A	23	2.0	1 x 5 x .375
	ML755A	20	2.5	1 x 6 x .375
	ML756A	50	2.0	2 x 8 x .375
	ML757	100	1.5	2 x 14 x .375
TORSIONAL MODE — Ultra stable with temperature coefficient less than .5 PPM/°C available. Signal to spurious noise 10:1 dynamic 30:1 static. All units provide a ± 4 μ sec adjustment. Unsealed or hermetically sealed to meet MIL specs.	MT762A-1	250	2.5	4 x 5 x .50
	MT762A-2	500	2.0	4 x 5 x .50
	MT762A-3	2000	1.5	4 x 5 x .50
	MT763A-1	3000	1.5	6 x 7 x .50
	MT763A-2	5000	1.2	6 x 7 x .50
	MT765A-1	10000	1.0	10.5 x 11.5 x .56
	MT765A-2	15000	0.75	10.5 x 11.5 x .56

SERIAL COMPUTER MEMORIES

	Model	Maximum Storage Bits RZ	Maximum Bit Rate RZ — MC	Size
COMPLETE UNITY GAIN MEMORY SYSTEMS supplied with transistorized circuitry for operation in any required mode RZ, NRZ or Bi-Polar. These units use the MT760 Delay Line series and have the exceptional stability and high signal to noise ratio of these Delay Lines. Can be cascaded and complete memory stacks are also provided. Maximum storage can be doubled by operating in the NRZ mode.,	MS772B-1	625	2.5	4.5 x 6.20 x 1.12
	MS772B-2	1000	2.0	4.5 x 6.20 x 1.12
	MS772B-3	3000	1.5	4.5 x 6.20 x 1.12
	MS773A-1	4500	1.5	8 x 10.5 x .62
	MS773A-2	6000	1.2	8 x 10.5 x .62
	MS775A-1	10000	1.0	12.0 x 15.0 x .7
	MS775A-2	11250	.75	12.0 x 15.0 x .7

VARIABLE DELAYS

	Model	Delay Range Microsec.	Max Bit Rate RZ MC	C.W. B.W. MC	Size
SINGLE SHAFT CONTROL provides infinite resolution over a wide range of delays. Ideal for Radar Range Calibration, Simulation or Correlation work. 6 decade switch system provides .1 μ sec resolution.	MV994	2-18	2.0	1.5-2.5	1 x 5 x .5
	MV781A	2-30	2.0	1.5-2.5	1 x 9 x .5
	MV782	30-100	1.0	.8-1.2	2 x 15 x .5
	MV784	10-5000	.3	.2- .4	10.0 Dia. x 8
	MV785	10-100,000	1.0	.8-1.2	19 x 17 x 10.5

CORRELATION DELAY LINES — ELECTRICALLY VARIABLE

	Model	Max. Delay Seconds	Frequency Response	Size
LONG DELAYS OF COMPLEX SIGNALS with very little distortion. Ideal for correlation work. Supplied as: Fixed Delays; Multi-tap Delays; Variable Delays by means of switches or as an Electrically Variable system wherein delay is a function of a control voltage.	MA574	.01	10 cps to 50 Kc	12 x 12 x 3
	MA880	.03	10 cps to 50 Kc	12 x 22 x 18
	MA1005	.10	10 cps to 25 Kc	15 x 22 x 18
	MA1006	1.0	10 cps to 10 Kc	24 x 27 x 49

MULTIPLE OUTPUT DELAYS

	Model	Total Delay Microsec.	No. of Taps	Tap Spacing or Location Microsec.	Size
CODE GENERATORS — Provide as many tap positions as desired at any spacing desired (.2 μ sec min.). Fast rise times. Also provided with in and out circuitry. Used as parallel to serial and serial to parallel converters.	ML790	16	16	1.0	1.75 x 8 x .50
	ML718	15	12	1.25	1.75 x 8 x .50
	ML791	20.3	14	1.45	1.75 x 8 x .50
	ML883	28	24	1.0	3 x 9.37 x .50
MULTIPLE OUTPUTS — Adjustable independently over range ± 6 μ sec for radar correlation work. Units are supplied as unity gain packages complete with drivers, amplifiers and shapers.	MS283	30.5	4	12, 15, 18, 30	4 x 12 x 1.5
	MS402	48.0	6	2, 5, 8, 12, 14, 48	5 x 10 x 2.75
	MS399	16.3	3	6, 12, 16	4 x 12 x 1.5

DISTRIBUTED CONSTANT DELAY LINES

DD680 SERIES NANOSECOND MODULES

	Delay Choice Nanosec.	Impedance Choice Ohms	Delay to Rise Time Ratio	Size
DISTRIBUTED CONSTANT — Epoxy encapsulated. Temperature coefficient less than 120 PPM/°C. Case size depends on delay to rise time ratio.	5, 10, 20, 30	93, 330	5:1	.5 x .31 x 2.25
	40, 50, 60, 70 80, 90, 100	500, 1000	10:1	1.0 x .31 x 2.25

DD679 SERIES MICROSECOND MODULES

	Delay Choice Microsec.	Impedance Choice Ohms	Delay to Rise Time Ratio	Size
DISTRIBUTED CONSTANT — Epoxy encapsulated. Temperature coefficient less than 120 PPM/°C — Can be cascaded to obtain longer delays — other delays and impedance available.	.1, .2, .3, .4, .5	330, 500	5:1	.5 x .375 x 4.5
	.6, .7, .8, .9, 1.0	1000	10:1	1.0 x .375 x 4.5
	2.0; 4.0; 5.0; 10.0	500, 1000	10:1	1.0 x .5 x 4.5

INFINITE RESOLUTION VARIABLE REEL DELAY LINE

	Model	Delay Range Nanosec.	3 db B.W. Mc	Resolu- tion	Impe- dance Ohms	Attenu- ation Db	Size
DISTRIBUTED CONSTANT — With input and output impedance of equal value — can be spliced directly into interconnecting coaxial cables — IDEAL PHASE SHIFTER. Usable to 200 Mc — Single shaft control — BNC connectors.	DV581	2-50	70	Infinite	200	1	1.0 x 1.75 x 5.37
	DV576A	2-50	70	Infinite	93	1	1.0 x 1.75 x 5.37

DELAYS UP TO 100 NANOSEC. AND OTHER IMPEDANCES ALSO AVAILABLE.

HIGHEST QUALITY • FASTEST DELIVERY

This condensed catalogue information is only meant to serve as a guide. Before finalizing on a design it is most prudent to utilize the experience, ingenuity and up-to-date information of our Engineering Staff. Expert guidance, which can save you hours of searching, is as close to you as your telephone —

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